National Renewable Energy Laboratory

Request for Information No. RCL-4-0001

Hydrogen Systems Engineering Models

REQUEST FOR INFORMATION

READ THIS DOCUMENT CAREFULLY

This Request for Information (RFI) is being issued by the National Renewable Energy Laboratory (NREL) to obtain information on existing engineering models that may assist in the assessment of technologies and systems that may comprise a future national hydrogen infrastructure that includes production, delivery, storage, conversion, vehicle, and building technologies and subsystems.

This RFI serves to request information for planning purposes only. It does not constitute, and should not be construed, as a procurement or financial assistance solicitation or a promise to issue a procurement or financial assistance solicitation in the future.

Issue Date: 12/01/03 Due Date: 02/18/04 Time Due: 4:30 p.m. Mountain Time

1. Solicitation Type Request for Information

2. NREL RFI Contact

Submit RFI response to and request information from the NREL RFI Contact

Randy W. Combs, RFI Administrator
MS 1632
National Renewable Energy Laboratory
1617 Cole Boulevard
Golden, CO 80401-3393
Phone: (303) 275-4442
Fax: (303) 275-3714
Email: randy_combs@nrel.gov

3. Background

The National Energy Policy, published in May 2001, recommends that "the President direct the Secretary of Energy to develop next-generation technology—including hydrogen and fusion." In response to this recommendation, the Department of Energy (DOE) sponsored a National Hydrogen Vision Meeting on November 15-16, 2001, in Washington, DC. Participants included more than 50 business executives and public policy leaders from Federal and State agencies, the U.S. Congress, and environmental organizations. The aims of the meeting were to identify a common vision for the hydrogen-based economy, the time frame in which such a vision could be

expected to occur, and the key milestones for achieving it. [Access the results of the Hydrogen Vision Meeting at http://www.eere.energy.gov/hydrogenandfuelcells/pdfs/vision_doc.pdf]

Building on these findings and recommendations, DOE organized a National Hydrogen Energy Roadmap Workshop in Washington, DC during April 2-3, 2002. These events and the products of these working groups culminated in the publication of the National Hydrogen Energy Roadmap in November 2002. [Access the Hydrogen Energy Roadmap at http://www.eere.energy.gov/hydrogenandfuelcells/pdfs/national_h2_roadmap.pdf]

In January, 2003 in his State of the Union address, President Bush announced a $1.2 billion hydrogen initiative to develop the technologies and infrastructure needed to produce, store, and distribute hydrogen for use in fuel cell vehicles and to generate electricity. The hydrogen initiative is designed to significantly improve America's energy security reducing our dependence on imported oil, and improve the environment by reducing air pollution, including greenhouse gases that contribute to global climate change. [Access the President's State of the Union address at http://www.whitehouse.gov/news/releases/2003/01/20030128-19.html]

To integrate the many and varied aspects of the hydrogen initiative; technical, economic, and programmatic; the National Hydrogen Energy Roadmap calls for establishing a systems integration function. According to the roadmap, "effective design and implementation of a hydrogen-based energy system requires a "whole system" approach. Complex dependencies among the diverse system components dictate that cross-cutting, system-level issues and concerns receive close attention."

The President's hydrogen initiative complements the President's FreedomCAR initiative, which is developing technologies that will be needed to produce safe and affordable hydrogen-powered fuel cell vehicles. Through partnerships with industry, the fuel cell vehicle initiative seeks to make vehicles cost effective for large numbers of Americans by 2020. [Access information about FreedomCAR at http://www.eere.energy.gov/hydrogenfuel/]

4. Objectives

The objective of this RFI is to obtain information related to development of a full spectrum of physical components and processes, from production through end use, of the hydrogen-based economy technologies and infrastructure, including hydrogen powered vehicles. This will be accomplished by collecting information about existing engineering models that are currently being used to analyze the technologies or infrastructure subsystems used to produce, store, deliver, convert to, or use hydrogen.

5. Scope of Interest

NREL requests that you submit engineering model information on any the following systems.

- Hydrogen Production systems
- Hydrogen Delivery Systems
- Hydrogen Storage systems

- Hydrogen Conversion systems
- Hydrogen Vehicle systems
- Hydrogen Building systems

Please submit information in sufficient detail for a complete understanding of each of the following elements.

1. Title or name of the model.
2. Description of the model.
3. Primary contact for information about the model (name, phone, address, email).
4. Purpose or goal of the model.
5. Key questions or issues the model was designed or developed to address.
6. Technology (ies) or infrastructure subsystem(s) that that the model addresses or could address.
   [Refer to Attachment 1— systems flowchart. Indicate technology (ies), (such as Electrochemical for production, or carbon nanotubes for storage production) and/or the infrastructure subsystems (such as storage, delivery, conversion, vehicle use or building system use).]
7. Hydrogen RD&D Plan technical milestones that the model addresses or could address. Indicate technical milestones by corresponding number(s) and title, or if none of the technical milestones are addressed, state the technical objective that the model supports.
   [Access the draft of the Hydrogen, Fuel Cells & Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan at http://www.eere.energy.gov/hydrogenandfuelcells/mypp/ The technical milestones are located in the "Appendices Draft".]
8. Number of years that the model has been in use or development.
9. Type of external review or validation of the model.
10. Input values [Use units and description, such as storage capacity as a percentage by weight.]
11. Output values [use units and description.]
12. Key underlying assumptions.
13. Mathematical approach.

14. Simplifications used.

15. Limitations to the use of the model.

16. Computer platform needed to run model.

17. Programming language used.

18. Commercial software used (if any).

6. Potential use of information acquired in response to this RFI.

Information received in response to this RFI is for planning purpose only. As of the date of this RFI solicitation, no government or private funds have been appropriated or allocated to fund future transactions.

The National Renewable Energy Laboratory reserves the right to take no further action in response to the information received or may consider any number of possible partnering, procurement, licensing, or other transactions to acquire additional information or access to engineering models.

In the event that the National Renewable Energy Laboratory determines that the information provided in response to this RFI warrants further investigation, development, commercialization, or purchase, a separate negotiation will ensue and all business transaction scope, general terms and conditions, and patent and technical data right provisions shall be fully addressed and reconciled.

7. RFI preparation information

a. The RFI shall be submitted in the format as described at Section 5 "Scope of Interest" and shall be a maximum of 5 pages, excluding title page, printed marketing brochures, and other non-technical information.

Your response to this RFI shall include a title page, including the RFI title and number, name of your organization and point of contact (with postal address, telephone and fax numbers, and email address).

b. Formatting instructions
- A page is defined as one side of an 8 ½" x 11" sheet of paper.
- Use a 12-point font.
- Maintain at least 1-inch margins on all sides.
- Copies may be either single or double sided.

c. The response to this RFI should be provided in an original and three (3) copies.

f. This solicitation does not allow the submittal of facsimile or electronic responses.

g. This solicitation does not commit NREL to pay costs incurred in the preparation and submission of a response to this RFI. This RFI does not commit NREL or the Department of Energy to contract, subcontract, or promise of any nature whatsoever

for any supply or service. NREL and DOE will not pay for any information or administrative cost incurred in response to this RFI.

9. Solicitation Provisions—full text provided

a. Intent with respect to disclosure and use of data

It is the intent of the National Renewable Energy Laboratory to use the information provided in response to this RFI to establish a baseline of engineering models used to analyze the technologies or infrastructure subsystems existing or to be developed to produce, store, deliver, convert to, or use hydrogen.

Responders are encouraged to provide sufficient information to support this effort and to permit a complete understanding of the manner in which the engineering model(s) described can be used to support the development of a hydrogen-based economy for the United States. To this end, the free flow of information is critical. Responders are encouraged to provide only that type and depth of information that DOES NOT include business sensitive or proprietary information, (information that embodies (a) scientific, technical, and engineering information that may contain patentable concepts, or (b) trade secrets or (c) commercial or financial information that is privileged or confidential under the Freedom of Information Act.)

Responders who include in their RFIs any data that they do not want disclosed to the public for any purpose or used or disclosed outside the government or NREL shall—

1. Mark the title page with the following legend:
   "This Response to RFI includes data that shall not be disclosed outside the government or NREL and shall not be used or disclosed—in whole or in part—for any other purpose. If, however, any funded action is awarded to this responder as a result of—or in connection with—the submission of this data, the government or NREL shall have the right to use or disclose the data to the extent provided in the resulting funded action. This restriction does not limit the government or NREL's right to use information contained in this data if obtained from another source without restriction. The data subject to this restriction are contained on pages [insert page and line numbers or other identification of pages] of this response to RFI"; and

2. Mark each page of data it wishes to restrict with the following legend:
   "Use or disclosure of data contained on this page is subject to the restriction on the title page of this response to RFI."

b. Disclaimer

NEITHER THE UNITED STATES; NOR THE DEPARTMENT OF ENERGY; NOR MIDWEST RESEARCH INSTITUTE, NATIONAL RENEWABLE ENERGY LABORATORY DIVISION; NOR ANY OF THEIR CONTRACTORS,

SUBCONTRACTORS, OR THEIR EMPLOYEES MAKE ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUME ANY LEGAL LIABILITY OR RESPONSIBILITY FOR THE ACCURACY, COMPLETENESS, OR USEFULNESS FOR ANY PURPOSE OF ANY OF THE TECHNICAL INFORMATION OR DATA ATTACHED OR OTHERWISE PROVIDED HEREIN AS REFERENCE MATERIAL.

c. Solicitation complaints

The General Accounting Office and the Department of Energy do not accept or rule on disputes for solicitations for Requests for Information issued by Management and Operating Contractors for the Department of Energy (operators of Department of Energy National Laboratories). Should a responder have any concerns regarding the NREL solicitation process, the responder may contact Marty Noland, Advocate for Commercial Practices, at (303) 384-7550. NREL will address each concern received from an responder on an individual basis.